

AMENDMENTS TO THE CLAIMS

(IN FORMAT COMPLIANT WITH THE REVISED 37 CFR 1.121)

1-2. (CANCELED).

3. (CURRENTLY AMENDED) A method of recording data on a recording medium comprising:

dividing the data into N-bit segments, where N is an integer greater than 1;

5           mapping the data to a set of write symbols comprising  $2^N$  distinct write symbols, wherein each write symbol represents ~~more than one bit~~ a possible N-bit segment of the data and wherein the set of write symbols is defined by:

          defining a set of variable write parameters;

10           generating a plurality of candidate write symbols that specify different values for the variable write parameters;

          generating a plurality of analog readout waveforms produced by the plurality of candidate write symbols;

15           analyzing the analog readout waveforms to determine a set of distinguishable readout waveforms; and

          selecting selected ones of the plurality of candidate write symbols that correspond to the distinguishable readout waveforms to be included in the set of write symbols; and

20        writing the data to the medium using the set of write  
symbols.

4.        (ORIGINAL) A method of recording data on a medium as  
recited in claim 3 wherein the medium is an optical disc.

5.        (ORIGINAL) A method of recording data on a medium as  
recited in claim 3 wherein the medium is a phase change optical  
disc.

6.        (ORIGINAL) A method of recording data on a medium as  
recited in claim 3 wherein the set of variable write parameters  
defines characteristics of a sequence of laser pulses.

7.        (ORIGINAL) A method of recording data on a medium as  
recited in claim 3 wherein the set of variable write parameters  
defines the timing of a sequence of laser pulses.

8.        (PREVIOUSLY PRESENTED) A method of recording data on  
a medium as recited in claim 3 wherein writing the data to the  
medium includes inserting guard bands between the write symbols on  
a track.

9. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 wherein writing the data to the medium includes inserting guard bands between the write symbols on a track, wherein the guard bands are appropriately sized to avoid intersymbol interference.

10. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 wherein writing the data to the medium includes inserting guard bands between the write symbols on a track, wherein the guard bands are appropriately sized to avoid thermal crosstalk.

11. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 further comprising using matched filter detection to recover the data.

12. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein a cross correlation coefficient is calculated to recover the data.

13. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein a combination of a cross correlation coefficient and comparison of a DC level is used to recover the data.

14-15. (CANCELED).

16. (CURRENTLY AMENDED) A method of recording data on a recording medium comprising:

dividing the data into N-bit segments, where N is an integer greater than 1;

5 mapping the data to a set of write symbols comprising  $2^N$  distinct write symbols, wherein each write symbol represents ~~more than one bit~~ a possible N-bit segment of the data and wherein the set of write symbols is defined by:

defining a set of variable write parameters;

10 generating a plurality of candidate write symbols that specify different values for the variable write parameters;

generating a plurality of readout waveforms in response to marks produced by the plurality of candidate write symbols;

15 analyzing the readout waveforms produced by the marks to determine a set of readout waveforms that match a read/write channel that includes the recording medium; and

20 selecting selected ones of the plurality of candidate write symbols that correspond to the readout waveforms that match the read/write channel that includes the recording medium to be included in the set of write symbols; and

writing the data to the medium using the set of write symbols

17. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using a genetic algorithm to generate the plurality of candidate write symbols.

18. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes randomly generating the plurality of candidate write symbols.

19. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using expert knowledge to generate the plurality of candidate write symbols.

20. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using expert knowledge to generate an initial

5 set of candidate write symbols and using a genetic algorithm to refine the initial set of candidate write symbols.

21. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair of waveforms to  
5 represent individual channel bits.

22. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair of waveforms to  
5 represent individual channel bits and shifting and adding combinations of the waveforms.

23. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair of waveforms to  
5 represent individual channel bits wherein a spectrum of the pair of waveforms becomes band-limited and resembles a spectrum of a signal-to-noise ratio  $SNR(f)$  of the read/write channel.

24. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein analyzing the readout waveforms produced by the marks to determine a set of readout waveforms that match a read/write channel that includes the recording medium includes determining ideal readout waveforms that follow the read/write channel SNR spectrum.

25. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the medium is an optical disc.

26. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the medium is a phase change optical disc.

27. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the set of variable write parameters defines characteristics of a sequence of laser pulses.

28. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the set of variable write parameters defines the timing of a sequence of laser pulses.

29. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein a Viterbi detector is used to recover the data.

30. (CURRENTLY AMENDED) A method of recording data on a medium as recited in claim 11 wherein the matched filter detection comprises comparing analog readout waveforms obtained from individual segments to waveforms in pre-stored tables using  
5 predetermined pattern recognition techniques.

31. (CURRENTLY AMENDED) A method of recording data on a medium as recited in claim 11 wherein the matched filter detection comprises:

sampling ~~a~~ an analog readout waveform signal;  
5 normalizing an amplitude of the sampled signal; and  
separating the sampled signal into segments.

32. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 31 wherein the matched filter detection further comprises:

calculating a cross-correlation coefficient between the  
5 segments and patterns in a look-up table; and

comparing a DC level of the segments with the patterns in the look-up table.



33. (PREVIOUSLY PRESENTED) A method of recording data on  
a medium as recited in claim 3 wherein the variable write  
parameters comprise one or more of a height of a laser pulse, a  
duration of a laser pulse, a width of a cooling pulse following a  
5 heating pulse, an interval between adjacent laser pulses, and a  
power level of a laser pulse.